BOX2D LIGHTS

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1. What Is Box2d?

- Box2D is a physics library for 2D games.

- Its allows you to control physical properties such as, density, friction, elasticity or restitution, velocity, acceleration, collisions, etc.

2. BOX2D Basic Concepts

World

It's a "wrapper for the game". It contains the elements of the game such as bodies, fixtures, lights...

Body

Objects that represent entities of the world.

BodyDef

It knows the position, type, velocity... of the body.

Fixture

Shapes the bodies.

FixtureDef

It knows the shape, and physical properties of the object such a density, restitution, friction.

Shape

It is 2D geometrical object.

Box2DDebugRenderer

Together with a camera it is used to draw a scheme of the world.

Types Of Body

StaticBody

Doesn't move under simulation.

KinematicBody

It is moves under simulation according to its velocity. They do not respond to external forces.

DynamicBody

It is fully simulated. They can be moved manually by the user.

Example Code - I

```
public void show() {
     world = new World(new Vector2(x,y), true);
     renderer = new Box2DDebugRenderer();
}
```

```
public void render(float delta) {

world.step(delta, 6, 2);
renderer.render(world, camera.combined);

}
```

Example Code – II

```
public void show() {

     BodyDef wallBodyDef = new BodyDef();
     wallBodyDef.position.set(96,96);
     wallBodyDef.type = BodyDef.BodyType.StaticBody;
     wallBody = world.createBody(wallBodyDef);

     PolygonShape wallshape = new PolygonShape();
     wallshape.setAsBox(32,32);

     FixtureDef wallFixtureDef = new FixtureDef();
     wallFixtureDef.density = 1;
     wallFixtureDef.shape = wallshape;
     wall1Fixture = wallBody.createFixture(wallFixtureDef);

}
```

3. WHAT IS BOX2D LIGHTS?

- Box2DLights is a library that works *"under"* Box2D.

- It allows you to create lights and modify things about the lighting.

4. BOX2D LIGHTS BASIC CONCEPTS

RayHandler

- It is a handler class for all the lights.
- Ray handler manages updating, rendering and disposing the lights.

PointLigh

- It simulate a point of lights.
- It usually have circle shape.

ConeLight

It simulate a cone of light.

DirectionalLight

It simulate light source that location is at infinite distance. This means that direction and intensity is the same everywhere.

ChainLight

It simulate a chain of lights.

5. INTERESTING METHODS OF RAYHANDLER

- rayHandler.setXRay(boolean) → To make the lights go through the objects.
- rayHandler.setBlurNum(int) → To make the light more realistic (to make the shadows better …)
- rayHandler.setShadows(boolean) → To make ambient light and shadows.
- rayHandler.setAmbientLight(red, green, blue, alpha) → To specify the ambient light.

Example Code – III

```
public void show(){

     rayHandler = new RayHandler(world);

}
```

```
public void render(float delta){

     rayHandler.setCombinedMatrix(orthographicCamera);
     rayHandler.updateAndRender();

}
```

Example Code – IV

```
public void show(){

    pointLight = new PointLight(rayHandler,RAY_NUM, Color, distance,
                                        X, Y);


    directionalLight = new DirectionalLight(rayHandler,RAY_NUM, Color,
                                                directionDegree);


    coneLight = new ConeLight(rayHandler, RAY_NUM, color, distance, X,
                                        Y, directionDegree, coneDegree);
}
```